



Aalborg Universitet

AALBORG UNIVERSITY
DENMARK

Sub-Tg Enthalpy Relaxation and its Impact on Crystallization in a Hyperquenched Poor Oxide Glass former

Zhang, Yanfei; Hu, L. N.; Liu, S. J.; Zhu, C. F.; Yue, Yuanzheng

Publication date:
2012

Document Version
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Zhang, Y., Hu, L. N., Liu, S. J., Zhu, C. F., & Yue, Y. (2012). *Sub-Tg Enthalpy Relaxation and its Impact on Crystallization in a Hyperquenched Poor Oxide Glass former*. Abstract from XIII International Conference on Physics of Non-Crystalline Solids, Yichang, China.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

SUB- T_g ENTHALPY RELAXATION AND ITS IMPACT ON CRYSTALLIZATION IN A HYPERQUENCHED POOR OXIDE GLASS FORMER

Yanfei Zhang^{1,2*}, Lina Hu³, Shujiang Liu¹, Chaofeng Zhu¹, Yuanzheng Yue^{1,2}

¹Key Laboratory of Processing and Testing Technology of Glass & Functional Ceramics of Shandong Province, Shandong Polytechnic University, Jinan 250353, China

²Section of Chemistry, Aalborg University, Aalborg DK-9000, Denmark

³Key laboratory of Liquid Structure and Heredity of Materials (Ministry of Education), Shandong University, Jinan 250061, People's Republic of China

* Email address of presenting author: zf@bio.aau.dk

Abstract: In this work we present some new results about the sub- T_g enthalpy relaxation in a hyperquenched glass, which is obtained from an oxide melt with extremely low glass-forming ability (GFA). The low GFA is reflected by a very sharp exothermic peak that occurs slightly above the glass transition temperature. We also show how the sub- T_g annealing affects crystallization during dynamic heating process. This study is conducted by using the differential scanning calorimetry (DSC) and x-ray diffraction. We have observed a non-monotonic trend of both the enthalpy recovered during the first DSC upscan and the isobaric heat capacity (C_p) measured during the second upscan with sub- T_g annealing time. By analyzing the relaxation patterns of the C_p curve, we confirm that both α - and β -relaxations are involved in the sub- T_g annealing. Furthermore, the crystallization peak of the samples annealed even for short time shifts to higher temperature compared to the as-hyperquenched glass. This implies that the atoms in local structural regions is rearranged as a consequence of annealing in the manner that more ordered domains appears, which makes nucleation more readily. In summary, the glass under study has a high degree of structural heterogeneity, and hence, to a strong tendency to crystallization.

Topic: _Glass transition and Relaxation phenomenon_ Number of topic: 1

I prefer ☒ oral ☐ poster presentation